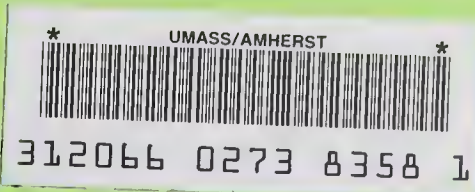


MASS. G67.8:W48/N95



# NUTS AND BOLTS

A RESOURCE GUIDE  
ON NON-TRADITIONAL JOBS  
FOR WOMEN

GOVERNMENT DOCUMENTS  
COLLECTION

SEP 20 1990

University of Massachusetts  
Depository Copy

THE GOVERNOR'S OFFICE  
ON WOMEN'S ISSUES

MICHAEL S. DUKAKIS  
GOVERNOR

VIVIEN LI  
ADVISOR ON WOMEN'S ISSUES  
AND CONSTITUENT SERVICES

May, 1990



NUTS AND BOLTS:

A RESOURCE GUIDE ON NON-TRADITIONAL CAREERS FOR YOUNG WOMEN

The Governor's Office on Women's Issues

Michael S. Dukakis, Governor

Vivien Li, Director

May 1990

## TABLE OF CONTENTS

Introduction	p. 1
I. Women's Work Today	p. 2
II. Nontraditional Occupations for Women	p. 5
III. Strategies	p. 10
IV. Occupational Prospects for the Nineties	p. 14
V. Apprenticeship	p. 17
VI. Resource Guide	p. 20
VII. Appendix A: Growing Occupations	p. 35
VIII. Appendix B: Women in Nontraditional Careers	p. 37

## INTRODUCTION

Although the role of women in the workforce has been rapidly changing in recent decades, attitudes about sex roles have been changing much more slowly. Many young women today are not adequately prepared to face the economic realities of their adult lives. Recognizing the urgency of this problem, the Governor's Office on Women's Issues is pleased to present high school guidance counselors and educators with this handbook on nontraditional career choices for young women.

A significant factor for the earning discrepancies between men and women is the tendency for women to choose lower-paid jobs that provide less job security. In addition, society has generally undervalued the jobs that women do perform. There are numerous and wide-ranging reasons why women choose the jobs they do, relating to the attitudes of society, peer and family pressure, girls' perceptions of themselves, their lack of information about career possibilities, and their sometimes unrealistic expectations about work. In an effort to ensure that young women have access to better-paying opportunities, women need to have a wide variety of employment opportunities, including jobs that have traditionally been closed to them.

Nontraditional occupations offer women a route to economic self-sufficiency and personal satisfaction. Over the next ten years, Massachusetts will invest more than ten billion dollars in a large number of public and private development projects in the Greater Boston region alone. It is vital that we prepare young women now to be able to participate equally in the anticipated economic growth.

The following pages include background on present sex-segregation in the workforce, a discussion of nontraditional careers, and some suggested strategies for helping young women enter nontraditional careers as a means of economic advancement.

We encourage you to share this information with colleagues and students. Many of the suggested strategies serve as models for curriculum units in the classroom or as guidance department presentations.



## I. WOMEN'S WORK TODAY

### SOME ADVANCEMENTS WOMEN HAVE MADE

Young women today face a very different future than that which their grandmothers or even their mothers faced. Just forty years ago, most young women expected that they would spend much of their lives working inside the home as wives and mothers. If they did work outside the home, they often expected their job to be of limited duration, lasting only until they got married or until their husband had finished school.

World War II caused a dramatic change, in which women were encouraged to take over vital occupations while men were away at war. Women became welders, riveters and machinists, and they built ships, munitions and airplanes. While most of these women returned to their homes after the war, women since then have continued to enter an ever-widening circle of occupations.

Today more women are entering the workforce than ever before.

- o 16 year old young women today can expect to spend an average of 30 to 40 years of their lives working outside the home.
- o 58% of married women in Massachusetts work outside the home.
- o 46.5% of all workers in New England are women.

Attitudes about women's and men's capabilities are changing and today we recognize that women and men are able to perform much the same work. Legal barriers have helped women to enter a variety of occupations. Today, we see women who are plumbers, lawyers and police officers, as well as men who are secretaries, nurses and kindergarten teachers. Today, young women who are entering the workforce have many more opportunities available to them than did women entering the workforce only ten years earlier.

Our schools have been an important factor in the process of widening opportunities for young women. Throughout the last century, colleges and universities have opened their doors to women, enabling women to obtain the education they need. High schools that used to send young men to shop classes and young women to home economics classes are now allowing and encouraging students of both sexes to study these subjects. While in the past some young women were dissuaded from taking advanced math courses, high school educators are now making sure that young women are able to take any math course they want.

## LABOR IS STILL LARGELY SEX-SEGREGATED

As long as women have been working outside the home, there have been prejudices about what types of work are "women's work" and what types are "men's work". Despite the progress that has been made in making opportunities equally available to both sexes, labor patterns today are still largely governed by the same prejudices that determined the labor patterns of a hundred years ago.

- o Child care workers in Massachusetts make an average of \$4.75 to \$6.00 an hour. 96% of all child care workers are women.
- o Union wages for plumbers in Massachusetts are typically \$26.90 an hour. 99.6% of all plumbers are men.
- o Dental assistants in Massachusetts make an average of \$5.77 to \$7.30 an hour. 97.6% of all dental assistants are women.
- o Union wages for heating, air conditioning and refrigeration mechanics are typically \$20.47 an hour. 99.4% of them are men.
- o Licensed practical nurses make an average of \$15,000 to \$19,344 a year. 96% of them are women.
- o Mechanical engineers make an average of \$24,000 to \$55,000 a year. 96.3% of them are men.<sup>1</sup>

Over two out of every five employed women in New England has an administrative support or service occupation.<sup>2</sup> Administrative support occupations include secretaries, receptionists, and file clerks, while service occupations include child care workers, waitresses and dental assistants. The following table shows how dramatically the labor force is still divided according to sex:

---

1. U.S. Department of Labor.  
Ninety Jobs for the Nineties, Massachusetts Division of Employment Security, 1988.

2. Bureau of Labor Statistics, June 15, 1989.

# WOMEN IN SELECTED OCCUPATIONS

Traditionally "Men's Work"	Women as % of Total	Traditionally "Women's Work"	Women as % of Total
Occupation		Occupation	
Plumbers, Pipefitters, Steamfitters	0.4	Secretaries	99.1
Brickmasons, Stonemasons	0.5	Dental Hygienists	98.7
Auto Mechanics	0.7	Kindergarten Teachers	98.2
Electricians	1.4	Childcare Workers	96.0
Carpenters	1.5	Cleaners & Servants	95.6
Airplane Pilots	3.1	Registered Nurses	94.6
Aircraft Engine Mechanics	3.7	Bank Tellers	91.0
Machinists	4.8	Sewing Machine Operators	90.1
Engineers	7.3	Hairdressers and Cosmetologists	89.5
Precision Production Craft and Repair	8.7	Elementary Teachers	84.8
Data Processing	8.8	File Clerks	83.3
Equipment Repair			
Dentists	9.3	Sales Workers, Apparel	83.2
Police and Detectives	13.4	Waitresses	82.6
Architects	14.6	Administrative Support	80.1

SOURCE: U.S. Department of Labor, Bureau of Labor Statistics,  
Employment and Earnings, 1988.

Occupations traditionally considered "men's work" are generally higher paying than those considered "women's work". This segregation of the labor force is also apparent in vocational secondary school courses. Often, most or all the students in an electronics course are young men while most of the students in a cosmetology course are young women.

Yet, with the appropriate education, training and guidance, young women can enter any career they choose.



## II. NONTRADITIONAL OCCUPATIONS FOR WOMEN

### WHAT IS A NONTRADITIONAL OCCUPATION?

Any occupation that has been traditionally considered "men's work" and in which men continue to be overrepresented is a nontraditional occupation for women. Officially, the U.S. Department of Labor considers an occupation nontraditional if less than 25% of the people employed in it are women. Among nontraditional careers that are still comprised of almost only male workers are: auto mechanics, metal workers, and airplane pilots. Surprisingly, a number of careers that are more widely perceived as open to women are still nontraditional, such as lawyers, physicians and architects.

There are a wide variety of nontraditional options for women. These can include jobs in the building trades such as carpenters, equipment operators and electricians, all of which can provide women with personal satisfaction and a solid economic future. Yet there is also a vast array of jobs outside the trades that can be ideal for women. For the college-bound student, engineering, the law, and dentistry are all excellent choices. For the non-college-bound student there are many paraprofessional jobs that require only a year or two of post-secondary training, such as drafters, electronics technicians, and medical laboratory technicians.

### SOME NONTRADITIONAL OCCUPATIONS FOR WOMEN

Aerospace Engineer	Drafter
Aircraft Engine Mechanic	Electrician
Airplane Pilot	Electronics Technician
Announcer	Firefighter
Architect	Geologist
Athlete	Groundskeeper or Gardener
Automobile Mechanic	Judge
Brickmason	Locomotive Operator
Cabinetmaker	Machinist
Carpenter	Medical Laboratory Technician
Carpet Installer	Office Machine Repairer
Chemist	Painter
Civil Engineer	Photoengraver
Construction Inspector	Police or Detective
Data Processing Equip. Repairer	Surveyor
Dentist	Tool and Die Maker

## WHY CHOOSE A NONTRADITIONAL CAREER?

Some young women do not think that they would be interested in a nontraditional career, or they simply never consider the possibility. Yet every year more and more women are entering nontraditional careers and enjoying it. Nontraditional careers are good choices for a variety of reasons, particularly because of the relatively higher wages.

### EARNINGS

The most striking difference between traditional "women's work" and "men's work" is the pay. Today the average female worker still earns only 70% of what the average male worker earns. One factor that accounts for this differential is that a majority of women work in administrative support or service occupations which earn less than professional, technical or production occupations. For instance, a 1988 wage survey in Boston found that while an accounting clerk makes an average of \$8.63 an hour, an electronics technician typically makes \$12.36 and a motor vehicle mechanic typically makes \$14.99.

The consequences of this pattern are shocking:

- o 4.4 million women nationwide who are in the workforce live in poverty.
- o Of those 4.4 million, more than half are mothers of children under 18.
- o In 1986, one in every two working women who headed a family and who lived in poverty was employed in a service occupation.

Being able to earn a living wage is vital to many women and their families. The most recent census showed that 225,000 (or about 16%) of families in the Commonwealth were headed by a single female parent. A family cannot survive today on the income of a single person if that person is earning low wages. With half of all marriages ending in divorce, many women face the dilemma of having to support a family. Moreover, the high cost of living forces many married couples to depend on the income of two wage earners.

Young women must be taught to recognize the importance of economic self-sufficiency and to have realistic expectations about their working lives, and they must be adequately prepared to face the economic realities of their future.

### OTHER REASONS TO CHOOSE NONTRADITIONAL CAREERS

1. Nontraditional work usually involves learning a skill which provides greater job security and better prospects for advancement and self-employment.



2. Women who choose nontraditional jobs get a great deal of satisfaction from their work. Women in the trades often say that they prefer working outdoors to working in an office, and that they enjoy creating something useful. Women in technical and professional jobs like the intellectual challenge of their work.
3. Because of affirmative action goals, women workers are in great demand among construction contractors. Contractors have difficulty meeting hiring goals as there are few women workers. A survey of Boston's Southwest Corridor Project recently showed that four times out of five, the project was not even able to reach the very low hiring goal of 6.9% women. This does not mean, however, that women will always find it easy to be hired in nontraditional jobs, and many prejudices persist among employers. Women who are interested in nontraditional careers must recognize that while barriers still exist, there are far fewer than even five years ago.

#### WHY ARE THERE SO FEW WOMEN IN NONTRADITIONAL OCCUPATIONS?

Women comprise only a small percentage of workers in a number of different occupations. For instance, less than 10% of all skilled craft workers are women. Why is the labor force sex-segregated in this way?

MYTH: WOMEN ARE NOT ABLE TO PERFORM THE HARD PHYSICAL LABOR DEMANDED IN BLUE-COLLAR WORK.

REALITY: Actually, many blue-collar occupations do not require great physical strength. Electricians and equipment operators perform many tasks that require expertise and not sheer physical strength. Women who hold more physically demanding occupations, such as laborers, often say that while they had trouble initially they quickly built up strength. Just as some men are stronger than others, some women are better suited to physical work than others. There are women in every single occupation listed by the Department of Labor, demonstrating that women can perform jobs once considered only "men's work."

MYTH: WOMEN ARE JUST NOT INTERESTED IN NON-TRADITIONAL JOBS.

REALITY: Women are entering blue-collar occupations in increasing numbers. Today there are 7,599,000 women in blue-collar occupations.

MYTH: WOMEN CANNOT DO THE MATH REQUIRED IN TECHNICAL OCCUPATIONS.

REALITY: This is a half-truth. The reality is that young women take less math in high school on average than young men, thereby severely limiting their choices after high school. Young women should be encouraged to continue taking math throughout high school to insure that they will be adequately prepared for the job market.

---

SUMMARY OF BARRIERS TO WOMEN  
CHOOSING NONTRADITIONAL OCCUPATIONS <sup>3</sup>

- o Lack of Information about Nontraditional Occupations
- o Sex Biases in Assessment, Testing, and Counseling
- o Lack of Academic Preparation
- o Sexual Harassment and Discrimination in Training, Job Search and on the Job
- o Lack of Female Role Models In Nontraditional Occupations
- o Lack of Support and Encouragement to Pursue Nontraditional Occupations
- o Unrealistic Expectations and Perceptions about Jobs
- o Limited Perception of Self as Wage Earner
- o Math and Technical Anxiety
- o Lack of Connections or Networks with People in Nontraditional Occupations
- o Lack of Self Confidence
- o Fear of Stereotypes about Women in Nontraditional Occupations

---

Much of what deters young women from pursuing nontraditional careers relates to prevailing attitudes about sex roles. High school young women are at an age where they can be greatly influenced by other people's perceptions, and they can be easily discouraged by social pressure exerted by their peers and families. Parents who grew up in an era when fewer careers were open to women are sometimes skeptical about their daughters' chances in nontraditional careers.

---

3. Cited with permission from Choosing a Living Wage, A Career Exploration Workshop for Women, Jenifer Firestone.

For more information about Choosing a Living Wage, see "Organizations and Government Resources" in the Resource Guide.



The problem is compounded by the media, which tend to present women in mainly stereotypical roles. A glance through women's magazines reveals almost no depictions of women in nontraditional roles, while very few if any television programs feature a woman engineer, auto mechanic or carpenter. Thus, young women who are interested in nontraditional careers find very few role models. Often the problem is not that young women lack interest in nontraditional careers but simply that they have never considered them seriously. Having no role models can make it more difficult for young women to consider all options.

Lack of information and training is also a serious barrier to good careers for women. First, young women often do not know enough about the job-search process or about different career options to enable them to make informed decisions. Because little guidance information specifically targets young women, many of them are unaware of their nontraditional options. Older women sometimes regret that no one told them when they were young about the various job options that they only discovered after it was too late. When young women are uninformed about their career options, they are far more likely to choose traditional jobs.

Second, young women often lack the skills and training necessary to enter many nontraditional occupations. While a large number of nontraditional jobs require math, not enough high school young women take the necessary math courses to qualify for them. The case of the skilled trades is even more extreme. Girls are generally not taking the vocational education courses that would help them get jobs in the skilled trades, and they also tend to lack the familiarity with tools that young men often gain by helping their fathers around the house.

This is why you as an educator have a vital role to play. By informing young women of their full range of choices, by encouraging them to consider options they have not considered, and by offering them your support if they choose nontraditional paths, you can make a difference to many young women.

### III. STRATEGIES

The following is a brief list of suggestions to help young women make informed decisions about their fullest possible range of career options. Many guides also exist to provide educators with more information about outreach strategies, curriculum development, and other topics. The Sex Equity Coordinator for Massachusetts and the local desegregation assistance center, called the New England Center for Equity Assistance, are both good resources for that information. Both addresses are included at the end of this handbook.

#### 1. CAREER EXPLORATION AND DEVELOPMENT

Because a significant barrier to nontraditional careers for women is that some young women are not sufficiently oriented toward career planning, education about researching and applying for jobs can greatly help them. Here are some suggestions to consider which are creative and require minimal funds to implement:

##### o Minicourses and Workshops

Planning a minicourse or workshop, or doing a unit in the classroom about career exploration, can help inform young women. There are many good career exploration curricula available, some of which are mentioned in the Educators and Counselors section of the resource guide (the WINC curriculum is particularly recommended). The Massachusetts Sex Equity Coordinator should be able to provide more curriculum suggestions. Even certain smaller activities can be informative, such as assigning students to interview and report on a person in a nontraditional career, to prepare a presentation that explains and refutes myths about sex roles in the workplace, or to perform a research project on several different careers.

##### o Job Search Education

Students of both sexes, but particularly young women, need to be educated about the job search process. Teaching students how to research careers and how to get information on specific employers, and conducting classes on resume-writing and interviewing skills can make a big difference. The Women's Technical Institute, which has an impressive 94% job placement rate, attributes their success in part to the job search training that they provide for their students.

##### o Career Information

You might make sure that information about careers is readily available to students, not only in the guidance department but also in the classroom. There are two books which provide thorough information about occupations that every high school should consider purchasing.

The Occupational Outlook Handbook, published by the U.S. Department of Labor and updated frequently.  
Ninety Jobs for the Nineties, published by the Division of Employment Security (now renamed the Department of Employment and Training).



- o Career Readings  
You may wish to purchase books and subscriptions which describe different careers. For instance, Tradeswomen Magazine is an informative quarterly about women in the trades. Hard Hatted Women is a book of essays by and about women in different trades that provides an excellent introduction to a number of occupations.
- o Films  
Try spending one or several class periods showing films about women and men in different nontraditional occupations. Some good films are recommended in the Resource Guide.
- o Women's Achievement in the Curriculum  
Incorporating women's achievements into the regular curriculum can encourage young women to try to reach their full potential. Doing a unit on women writers in an English class, or women's history in a social studies class, is useful.

## 2. SEX-BIAS IN EDUCATIONAL MATERIALS

It might be necessary to reexamine your educational and career guidance materials to be certain that they are free from sex-bias. Pictures are especially important. Do the career materials portray women and men in nontraditional occupations? Do the materials about technical occupations contain any pictures of women? Do the educational materials picture working women? Do history textbooks mention famous women? Do math textbooks include pictures of young women as well as young men working problems? Do the word problems in math textbooks include characters of both sexes in non-stereotypical roles? Classroom posters are also important. The Resource Guide suggests some poster packets depicting women in nontraditional fields.

## 3. THE IMPORTANCE OF ROLE MODELS

The use of role models is one of the best ways to get young women interested in nontraditional careers.

### Finding them:

- o Keep track of female graduates who pursue nontraditional careers.
- o Contact local businesses to find out if they employ women, then contact those women.
- o Develop a list of women's groups, government agencies, and women business owners who can serve as a resource to students.

### Using them:

- o Make a file of these women available to students. Print an alumnae guide. Include information such as address, job description, and educational background.
- o Ask them to speak to classes.
- o Have them play a supportive role. Design a mentor program. Invite them to participate in support groups.

#### 4. OUTREACH STRATEGIES

It is important that young women know about the different educational opportunities that are available to them, such as vocational courses.

##### o Exploratory Visits

Teachers say that students enjoy making exploratory visits to the shop laboratories of their school or of a nearby vocational school. A valuable visit includes a presentation from the teacher encouraging young women to take vocational classes and a mini-project in which the young women get to use the tools to produce something that they can take home with them.

##### o Field trips

Field trips can include nearby post-secondary schools that prepare women for nontraditional jobs, such as the Women's Technical Institute in Boston.

They can also include job sites where students can see women in nontraditional jobs at work.

##### o Materials That Target Women

Developing materials that target women about vocational or technical studies can encourage them to explore new areas. Some examples are: creating a videotape or slide-tape presentation about vocational courses at your school; setting up a display in a visible location with information about nontraditional educational and career opportunities; and setting up a special table in the guidance department or a classroom with books about women in nontraditional jobs.

##### o Targeting Adult Women

If your school has an adult education program, try strengthening recruitment strategies to enlist members of the community. Some techniques are: speaking to groups that are likely to include women; asking community service organizations to refer women to your program; and advertising in locations where women are more likely to see the advertisements.

#### 5. SUPPORT GROUPS

Many women in nontraditional fields cite the lack of other women in the field as one of the great disadvantages they face. Support groups can help combat the feelings of isolation for young women in programs of study where there are very few other women. A young women's support group may have the negative effect of singling out young women students, however, so plan carefully to avoid this. Do not alter women's schedules significantly to allow them to meet with the group. Calling the group a "club" or "organization" might make young women less self-conscious than "support group". Always encourage them to join mixed-sex activities.



### Activities for Support Groups:

1. Invite role models to speak about their experiences.
2. Invite employers to speak about job opportunities.
3. Conduct on-site visits to workplaces.
4. Plan a program to educate and interest younger students in nontraditional occupations.
5. Research and discuss sexism and sexual harassment in the workplace.

## 5. FACILITIES FOR FEMALE STUDENTS

Having adequate changing facilities for young women can make a difference in their interest in vocational courses. Make sure that there are changing rooms, mirrors and showers available to young women and that they have enough time to use them after class.

## 6. EMPLOYERS

It is useful to be familiar with the employers that regularly hire from your school. Find out which employers have a good track record of hiring women and offering them opportunities for advancement.

## 7. CHILD CARE

If your student body includes adults and teen parents, find out about the child care assistance available. Consider establishing some type of child care services, possibly in conjunction with other schools or nearby employers to keep costs low. An informal resource and referral system could also be a great help to your students. Child care services may enable young women to obtain the high school education that would otherwise not be available to them.

MEGAPROJECTS

The problem of encouraging women to consider nontraditional fields takes on new urgency in Massachusetts as we enter the nineties. Over the next decade, the Commonwealth will be investing over \$10 billion in 18 major public or private development projects--known as the "Megaprojects"--including both the Harbor Cleanup and the Central Artery/Third Harbor Tunnel project. Women must be trained now so that they can fully participate in new opportunities generated by the boom.

These large projects will create a demand for labor in construction and construction-related industries. The projects are all located in the Greater Boston area, but they will be drawing labor from all over the Commonwealth. Although many people think of construction as only on-site jobs in the building trades, there will be many other opportunities in off-site work, including management, engineering, technical, environmental, financial and administrative support positions, which constitute up to a quarter of all new jobs.

The two largest "megaprojects" will generate many new jobs:

PROJECTED TOTAL OF NEW JOBS AT PEAK

Artery/Tunnel Project.....	3,832 on-site jobs.....	958 off-site jobs
Harbor Cleanup.....	2,250 on-site jobs.....	450 off-site jobs

It is estimated that at the peak of the building boom, if economic trends continue as they now are, more than 16,000 jobs will be available in the City of Boston alone. It might seem unwise to prepare young women for a career in an industry that will peak in the next decade and later require fewer workers, but this is not necessarily the case because women are currently so vastly underrepresented in that industry.

Projections indicate that a variety of new nontraditional jobs will be in demand in the coming years. On-site jobs include all jobs in the building trades. Off-site jobs include the following:

Architect  
Civil Engineer  
Civil Engineering Technician  
Computer Assisted Design/Drafting (CADD) Operator  
Computer Programmer  
Construction Manager  
Cost Analyst  
Engineering Aide  
Environmental Impact Consultant  
Survey Technician  
Truck Driver



## FASTEST GROWING OCCUPATIONS IN MASSACHUSETTS

Many of the occupations that are projected to grow the most in Massachusetts in the next decade are nontraditional jobs for women. Here are several examples of nontraditional jobs that could provide young women with a solid economic future.

Charts summarizing other fast-growing occupations in Massachusetts appear in the appendix.

---

### ARCHITECTS

Job Description:	Architects design buildings, taking into account clients' needs, aesthetics, safety and energy efficiency. Architects are involved in all phases of development, from the initial idea through construction, and as a result must have engineering and supervising skills.
Educational Requirements:	Architects must be licensed. A bachelor's degree in architecture plus three years of acceptable practical experience, or a master's degree in architecture plus two years of experience, is required for licensure.
Outlook:	Jobs for architects are projected to grow by 30 percent, although competition for jobs is likely to continue. Demand for architects is highly dependent on the level of construction. Consequently, jobs for architects could fluctuate.
Salary Range:	\$25,000 - \$45,000

---

### ELECTRICAL AND ELECTRONIC TECHNICIANS

Job Description:	Electrical and electronic engineering technicians and technologists assist engineers in developing and servicing electric and electronic equipment. Because this field is so broad, most technicians specialize in one area, such as automatic control devices or micro-computers.
Educational Requirements:	Employers prefer applicants who have had some technical training. Training is available at technical institutes, junior or community colleges, and vocational technical schools.
Outlook:	Job opportunities for electrical and electronic technicians and technologists will advance 45 percent, outpacing the job growth projected for electrical and electronic engineers.
Salary Range:	\$19,300 - \$25,900

---

## PLUMBERS AND PIPEFITTERS

**Job Description:** Plumbers and pipefitters build and repair water and waste disposal, drainage, and gas systems. Plumbers work with water pipes in homes, schools, and offices. Pipefitters work with industrial pipes that carry a variety of materials such as gas and hot water.

**Educational Requirements:** Apprenticeship or on-the-job training is the best way to learn this trade.

**Outlook:** Jobs for plumbers and pipefitters are projected to remain strong. Construction and renovation of water and sewer systems, power plants, schools, factories and other large scale projects are expected to spur job growth.

**Salary Range:** Hourly earnings \$26.90 for union journeymen plumbers.

---

**SOURCE:** Ninety Jobs for the Nineties, Massachusetts Division of Employment Security, 1988.



## V. APPRENTICESHIP

Apprenticeship is a training process through which individuals become highly skilled craft workers. It is an excellent method of learning a trade because apprentices receive on-the-job training combined with classroom instruction while earning wages during the training period. Apprenticeship programs are often run jointly by unions and employers.

Apprenticeship is a particularly valuable opportunity for women because it insures that they receive thorough training in the trade, giving them the job security of being highly skilled and increasing their chances for advancement and self-employment. According to the Bureau of Apprenticeship and Training, "experience indicates that apprentices are more motivated, learn their jobs faster, attain craftworkers status sooner, and are more likely to become supervisors than workers trained in other ways."<sup>4</sup> A survey conducted by the Associated General Contractors of America also demonstrates the advantages of apprenticeship: It showed that "90% of the top officials of construction companies who replied--presidents, vice-presidents, owners and partners--began as apprentices."<sup>5</sup> Clearly, apprenticeship provides a sound basis for advancement.

Apprenticeship differs from other types of training in several ways. First, it combines theoretical training in the classroom with actual experience at a worksite to give a wide understanding of the trade. Second, apprentices are paid while they train and receive regular wage increases. Third, it teaches the full range of skills required in the trade so that workers are not later limited to specific jobs. Fourth, many apprenticeship programs are registered with the Bureau of Apprenticeship and Training or the state apprenticeship agency -- in this state, the Massachusetts Department of Labor and Industries, Division of Apprentice Training -- which insures that they provide uniform and complete training within each craft. Graduates of such apprenticeship programs receive certificates upon completion which qualify them for jobs anywhere in the country.

There are over 800 apprenticeable occupations, although most workers are concentrated in approximately 50 of them.

### SOME APPRENTICEABLE OCCUPATIONS

o Automobile Mechanic	o Glazier
o Biomedical Equipment Technician	o Machinist
o Cabinetmaker	o Medical Laboratory Technician
o Carpenter	o Office Machine Serviceperson
o Cook (Chef)	o Painter
o Electrician	o Plumber
o Emergency Medical Technician	o Television-and-Radio Repairer
o Engraver	o Tool-and-Die Maker

---

4. The National Apprenticeship Program, Bureau of Apprenticeship and Training, U.S. Department of Labor, 1987, p.2.

5. Apprenticeship: Past and Present, U.S. Department of Labor, 1987, p.20.

## THE TRAINING

The period of apprenticeship usually lasts between two and five years, and apprentices receive wages throughout that time. During the training, apprentices work full time at actual job sites to complete a stipulated number of hours in on-the-job experience while attending classes. Apprentices study subjects such as math, blueprint reading, technologies associated with the trade, and health and safety practices. Apprentices are evaluated throughout the training process. Often after three to six months apprentices are eligible to join a union and to receive health benefits. Wages are raised periodically during the apprenticeship, with an apprentice typically earning 35%-40% of a journeyworker's wage at the beginning of the apprenticeship and 90%-95% by the end. Upon completion, the apprentice becomes a "journey level worker".

## THE APPLICATION PROCESS

Getting into apprenticeship programs is extremely competitive. It is helpful to have some familiarity with the trade, to have taken vocational education courses, to have held a job in the trade or to be familiar with the tools of the trade. The application process can last anywhere from several weeks to a year. Some apprenticeships will accept applications year-round, but more frequently there is a set time every year or every two years during which applications can be submitted. Most apprenticeships require a high school diploma or equivalent. Documents which might be required in the application include: birth certificate; high school transcript; high school diploma or GED certificate; transcripts from vocational school, and letters of recommendation.

After the application is submitted, many apprenticeship programs require applicants to take an exam. If the applicant passes, she is then likely to be called for an interview, which can be a crucial stage in the process. Importance is given to whether the applicant shows real motivation and desire to enter the trade, previous work experience, whether she has performed responsibly in school or at work, and whether she is willing to work hard.

## WHERE TO FIND OUT ABOUT APPRENTICESHIP POSSIBILITIES

The best place to find out about apprenticeship in Massachusetts are:

Division of Apprentice Training  
Department of Labor and Industries  
100 Cambridge Street  
Boston, MA 02202  
(617) 727-3486

Bureau of Apprenticeship and Training  
JFK Federal Building, Room 510  
Boston, MA 02203  
(617) 565-2288



## APPRENTICESHIP PREPAREDNESS

Sometimes women who wish to enter the trades feel uncomfortable about their knowledge of algebra and trigonometry, knowledge of the trades, or familiarity with tools. This is often due to the fact that young women have not learned these things in school or at home. Apprenticeship preparedness programs can help women gain the necessary qualifications by teaching them about the building trades and the tools, reviewing math skills, and preparing them for the application process. Currently there exists only one such program in the Boston area. For more information, contact:

Women in the Building Trades  
241 St. Botolph Street  
Boston, MA 02115  
(617) 266-2338

## VI. RESOURCE GUIDE

The materials that follow represent only a small number of the many publications on the subject of nontraditional roles for women. For more listings, see the Directories section of this booklet.

### Audiovisual Materials (~~This is a general listing.~~)

Many other AV materials are listed by subject.)

**Career Choices in Vocational Education: Is This Job For Me?** VHS. May be obtained through the Mass. Department of Education, Bureau of Educational Information Services.

Interviews with nontraditional workers and vocational students, their teachers, employers, and parents. Depicts an auto mechanic, paramedic, carpenter, and machinist who are each female and a nurse, dental assistant, cosmetologist and medical assistant who are each male.

**Get Ready!** Videotape. Available at a minimum cost through Women in the Building Trades, 241 St. Bodolph St., Boston, MA 02115 (617) 266-2338.

Presents an encouraging look at the construction trades for women.

**The Life and Times of Rosie the Riveter.** VHS and 16mm film, 60 min., 1980. Direct Cinema, Ltd., PO Box 69799, Los Angeles, CA 90069. (213) 652-8000. A history of the women who held nontraditional jobs during World War II.

**Never Underestimate the Power of a Woman.** 15 min. Madison Bureau of Audiovisual Instruction, University of Wisconsin Extension, Madison, WI. Depicts women in training for factory and craft jobs.

**Other Women, Other Work.** Film, 20 min. A Churchill Film. Available through The NETWORK, see address below. Experiences and problems faced by women working in traditionally male fields.

**Project Explore: Non-Traditional Career Exploration Life Skills Curriculum.** VHS and guides, 1983. Minuteman Regional Technical High School. Taped presentations by nine men and women on what it is like to pursue nontraditional careers.

**Sandra, Zella, Dee and Claire: Four Women in Science.** Videotape. WEEA Publishing Center, 55 Chapel St., Suite 200, Newton, MA 02160, (617) 969-7100. Directed at 7th through 12th graders. Visits four women at their worksites.

**Sarah the Welder.** Videotape, 1983. Massachusetts Educational Television, State Department of Education, 75 Acton St., Arlington, MA 02174. (617) 641-3710. A high school student overcomes the prejudices of her boyfriend, teachers, parents, and school administrators to be able to enroll in a welding class.

**The Sky's the Limit.** 20 min. Bryon Films, Washington, D.C. Women working in nontraditional trade apprenticeship programs.



**Who You Are and What You Are: Understanding Sex Roles.** Four filmstrips, 50 min. Guidance Associates, available through The NETWORK, address below.  
Looks at sex stereotypes and barriers to career development.

**Whose Job Is It?** VHS, 15 min., 1986. Center for New Directions, Idaho State University, Pocatello, ID 83209. (208) 236-2454.  
Profiles six women in nontraditional jobs, including a telephone installer, a heavy equipment operator, and a business owner.

### Posters and Games

**Career Posters.** General Electric Co., Educational Communications Division, Career Posters, Fairfield, CT 06431.

A continually updated series of posters relating to a wide variety of careers. Both men and women in nontraditional careers.

**Futures Unlimited: Real People, Real Jobs.** 10 posters, 1985. Consortium for Educational Equity, Rutgers University, New Brunswick, NJ 08903.  
Women in technical and vocational jobs, including an engineering shop technician, landscaper, apprentice electrician, and television technician.

**Posters on Women.** 5 sets of 8 posters each, 11" x 17". OEES Sets, Organization for Equal Education of the Sexes, 808 Union Street, Brooklyn, NY 11215. (718) 788-3478.

**Robot: An Introductory Career Game for Small Group Activity.** Available through The NETWORK, address below.  
This card game helps people develop realistic and non-restrictive attitudes toward future career choices.

**Supersisters.** Available through The NETWORK, address below.  
A collection of 72 cards provide biographical data on women who have made contributions in the areas of government, sports, business/labor, media, and science.

**Vocational Equity Posters.** 7 posters, 1985. Ysleta Independent School District, El Paso, TX.  
Women and men in nontraditional jobs, such as a painter, drafter, and welder.

**What's It Like to Be an Engineer?** 6 posters and guides, 1982. General Electric Department G-3, Fairfield, CT.  
Posters depict young white and minority female and male engineers in everyday situations using skills such as problem-solving, mathematics, and creative thinking.

**Women in the Building Trades** Available for \$10 from Women in the Building Trades, (617) 266-2338. Depicts women construction workers.

### Career Exploration and Development

**CHOICES: A Teen Woman's Journal for Self Awareness and Personal Planning.** 240 pp., 1984. Mindy Bingham, Judy Edmundson, and Sally Stryker. To order: Choices, Advocacy Press, PO Box 236, Santa Barbara, CA 93102.  
A workbook for teen-age women to prepare them to be independent and self-reliant adults. Exposes women to a wide variety of employment options, not just out-dated stereotypes.

**Choices/Changes: An Investigation into Alternative Occupational Role Models.** 60 pp. Mary Gilbert, WEEA Publishing Center, 55 Chapel St., Suite 200, Newton, MA 02160, (617) 959-7100.  
Twenty-nine mini-biographies for high school students about women and men in nontraditional careers.

**The Computer Careers Handbook.** 142 pp., 1983. Connie Winkler, ARCO Publishing, Inc., New York.  
Describes jobs with computers. Includes a special section on opportunities for women, the handicapped, and minorities.

**Follow Your Dream.** VHS, 6 1/2 min., 1988. YWCA of the U.S.A., Leadership Development Center, 9440 North 25th Avenue, Phoenix, AZ 85021. (602) 944-0569.

Promotes career planning for young women; racially diverse.

**Nontraditional Jobs for Women: A Resource Guide for Connecticut Women and Career Counselors.** 80 pp., 1981. Connecticut Permanent Commission on the Status of Women and Connecticut Department of Education, Hartford, CT.  
Intended for women exploring new careers. Job descriptions, pros and cons, how to explore the options. Useful for Massachusetts women as well.

**Time For a Change: A Woman's Guide to Nontraditional Occupations.** 81 pp., 1981. Constance Drake Cauley, Technical Education Research Centers, Cambridge, MA.

The advantages of nontraditional occupations, mythical barriers, real barriers, and how to overcome them. Descriptions of ten nontraditional jobs, sources of help, what to do next.

**Women Working.** 2 vols. Project FATE. To order: Tri-Equity, Inc., PO Box 388, Salem, NH 03079.

One volume treats the subject of physical fitness for working women and the other discusses different occupational choices for women.

### Directories and Catalogues

**Educational Equity Options Resource Bibliography.** Wider Opportunities for Women, Inc., address below.

**Equity in Science and Mathematics, A Selected Bibliography.** 9 pp. Consortium for Educational Equity, Kilmer Campus, New Brunswick, NJ 08903, (201) 932-2071/2072.

**The Feminist Press.** The City University of New York, 311 East 94 Street, New York, NY 10128.

Catalogue of books by and about women.

**A Helpful Guide for Teaching and Promoting Educational Equity: A Bibliography,** 4 pp. Resource Bank Program, Bureau of Educational Resources, Mass. Department of Education.

**Publications of the Women's Bureau.** 4 pp. The Women's Bureau, U.S. Department of Labor, address below.



**Sex Equity Issues in Vocational Education: A Selected Listing of Titles in the Mass. Vocational Curriculum Resource Center Collection.** Dec. 1987.

Contact: Mass. Vocational Curriculum Resource Center, address below.

**Women's History Resources.** Catalogue. National Women's History Project, PO Box 3716, Santa Rosa, CA 95402-3716.

Catalogue of posters, display kits, curriculum guides, books, and buttons.

**Women's Educational Equity Act Publishing Center.** Catalogue of publications. WEEA Publishing Center, 55 Chapel St., Suite 200, Newton, MA 02160, (617) 969-7100.

### Newsletters

**AWIM Newsletter.** Association for Women in Mathematics, c/o Department of Mathematics, Wellesley College, Wellesley, MA 02181. Bimonthly.

**AWIS Newsletter.** Association for Women in Science, 1346 Connecticut Avenue NW, Suite 1122, Washington, DC 20036. Bimonthly.

**Feminists in Science & Technology.** Science and Technology Task Force of the National Women's Studies Association, P.O. Box 6793, Houston, TX 77265. Quarterly.

**Math/Science Network: Newsletter.** Math/Science Resource Center, 2727 College Avenue, Berkeley, CA 94705. Irregular.

**NEW'S Letter.** Non-Traditional Employment for Women, 243 West 20th Street, New York, NY 10011. Quarterly.

**Sojourner: The Women's Forum.** 1050 Commonwealth Avenue, Suite 305, Boston, MA 02215.

**Tradeswomen** Tradeswomen, Inc., P.O. Box 40664, San Francisco, CA 94140. Quarterly.

**U.S. Woman Engineer.** Society of Women Engineers, 345 East 47 Street, New York, NY 10017. Bimonthly.

**Women in the Trades.** A newsletter for Northern New England Women in the Trades. c/o Step Up, 1 Prospect Street, St. Johnsbury VT 05819. Quarterly.

**Women and Mathematics Education Newsletter.** c/o Mt. Holyoke College, 302 Shattuck Hall, South Hadley, MA 01075. Three times per year.

### Math and Science

**Comets Profiles: Career Oriented Modules to Explore Topics in Science.** 1982. Department of Curriculum and Instruction, School of Education, University of Kansas. Available through The NETWORK, address below.



**Dropping Math? Say Goodbye to 82 Jobs.** Clarke Irwin & Co., Ltd., 791 St. Clair Ave., West, Toronto, Ontario, Canada, M6C 1B8.

A poster designed to encourage women to continue taking math.

**Futures Unlimited I: Expanding Your Horizons in Mathematics and Science.**

Videotape, 29 min. Consortium for Educational Equity, Rutgers University, New Brunswick, NJ 08903.

This video for young women and women demonstrates the importance of math in careers. Six role models are featured.

**The Math-Science Connection: Educating Young Women Today.** Film, 18 min.

WEEA Publishing Center, 55 Chapel St., Suite 200, Newton, MA 02160. (617) 969-7100.

**Nothing But Options.** VHS, BETA, 17 min., 1983. Math/Science Network, 2727 College Ave., Berkeley, CA 94705. (415) 841-6284.

Profiles of five young women in a variety of math and science careers including environmental science, electrical engineering, computer graphics, financial investing, and computer systems analysis.

**Science, Sex and Society.** 570 pp. Dr. Ann E. Kammer, WEEA Publishing Center, 55 Chapel St., Suite 200, Newton, MA 02160. (617) 969-7100.

For secondary and postsecondary young women, a collection of readings designed to help them make career choices in science.

**The Sky's the Limit in Math-Related Careers.** 44 pp. Joanne Koltnow, WEEA Publishing Center, 55 Chapel St., Suite 200, Newton, MA 02160. (617) 969-7100.

A handbook to educate high school students about careers in math and science.

**Women in Science Series.** VHS, U-Matic, BETA I, II or III. Seven 30 min. programs and one 40 min. program. Agency for Instructional Technology, Box A, Bloomington, IN, 47402-0120. 1-800-457-4502.

The programs depict many women who have careers as scientists. There are eight programs, covering a range of scientific fields from biomedical fields to physics and astronomy.

#### For Teachers and Counselors

**Admissions Strategies That Work: A Guide for Vocational Educators.** 1984.

Janice R. Moknos, Technical Education Research Centers, Inc., for Bureau of Program Services, Division of Occupational Education, Mass. Department of Education.

Presents workable strategies for developing and implementing admissions procedures that are useful, reliable and equitable.

**Attaining Sex Equity in the Classroom and in the Curriculum, Materials for Secondary School Educators.** Resource Center on Sex Roles in Education, National Foundation for the Improvement of Education. (Can be obtained through the Mass. Vocational Curriculum Resource Center, the call number is 370.14 Uniteds.)

**Careers Under Construction: A Career Exposure Curriculum in the Construction Industry.** Center for Law and Education in conjunction with the Massachusetts Department of Labor and Industries, Division of Apprentice Training.

**Checklist for Counteracting Race and Sex Bias in Educational Materials.** 43 pp. Martha P. Cotera, WEEA Publishing Center, 55 Chapel St., Suite 200, Newton, MA 02160. (617) 969-7100.

An easy-to-use handbook of guidelines and checklists to help evaluate bilingual and multicultural curriculum materials.

**Everybody Counts: A Report to the Nation on the Future of Mathematics Education.** 1989. National Research Council. This report outlines an approach for revitalizing mathematics education in the United States.

**Future Shares: Strategies for Increasing Sex-Fair Educational Practices in Nontraditional Training Courses.** 4 vols., 1984. Mass. Vocational Curriculum Resource Center, 758 Marrett Road, Lexington, MA 02173. (617) 863-1863 or 1-800-362-4371.

Designed to assist vocational teachers in coping with changes associated with teaching nontraditional students.

**Jobs, Justice, and Miracles: Towards a Commonwealth in Massachusetts in 1990.** 1989. Massachusetts Campaign for Jobs and Justice, 99 Bartlett Avenue, Arlington, MA 02174. Document lists recommendations for changes in employment for the 1990s.

**Making It Work.** 3 Modules, 1983. Bureau of Program Services, Division of Occupational Education, Mass. Department of Education.

Highly recommended vocational education in-service package focusing on drop-out prevention. Selected as one of ten National Dissemination 1984 Exemplary Product Award recipients. Three modules: "Conquering Your Dropout Woes", "Placing Your Vocational Educational Students", and "A Blueprint for Student Achievement".

**New Pioneers: A Program to Expand Sex-Role Expectations and Secondary Education.** 2 vols. Amanda J. Smith, WEEA Publishing Center, 55 Chapel St., Suite 200, Newton, MA 02160, (617) 969-7100.

A training program that exposes sexism in the curriculum.

**The Nuts and Bolts of NTO: How to Help Women Enter Nontraditional Occupations.** 204 pp., 1986. Jo Shuchat Sanders, The Scarecrow Press, Metuchen, NJ.

A guidebook to help recruit, train, and place women in nontraditional occupations.

**Project SCOPE (Support for Co-Educational Occupational Programs in Education).** 1981. Bureau of Program Services, Division of Occupational Education, Mass. Department of Education.

A series of handbooks of activities for support groups for vocational students in nontraditional programs.



**Rainbow Shave Ice ... Second Serving.** 1985. Sex Equity Goodies for the Classroom, Office of the State Director for Vocational Education, University of Hawaii.  
Overhead transparencies, bulletin board displays, short activities and exercises to stimulate discussion and interest in examining biases and stereotypes.

**Reshaping School Mathematics: A Philosophy and Framework for Curricula.** 1990. Mathematical Sciences Education Board, National Research Council.  
Report examines the changing role of mathematics and the use of technology.

**Stale Roles and Tight Buns.** VHS, 23 min., 1986. O.A.S.I.S., 15 Willoughby St., Brighton, MA 02315. (617) 782-7769.  
Exploring images of sex role stereotyping in newspapers, magazines, movies and on TV. Allows the audience to see the subtlety and continuation of sex role myths and expectations.

**Teaching Science and Health from a Feminist Perspective: A Practical Guide.** 1986. Sue B. Rosser, Pergamon Press, New York.

**Title IX and Chapter 622: Compliance Guidelines for Public Schools.** Mass. Department of Education.

**The U.N. Decade for Women, Documents and Dialogue.** Arvonne S. Fraser. 1987 Westview Press. Boulder and London.

**WINC Curriculum Guide.** 1984. Women's Bureau of the U.S. Department of Labor, Superintendent of Documents, Government Printing Office, Washington, DC 20402. (202) 523-8913.  
An excellent full curriculum for high school students on women in nontraditional work.

**With Both Eyes Open: Seeing Beyond Gender.** Patricia Altenbernd Johnson and Janet Kalven. 1988. Pilgrim Press, NY.

**Women in the Workplace Conference Proceedings.** 1986. Massachusetts Department of Public Health, 150 Tremont Street, Boston, MA 02111. Outlines proposed changes to assist women in the workforce.

**Women's Lives: Themes and Variations in Gender Learning.** Bernice Loff. 1987 Brooks/Cole Publishing. Monterey, CA.

**You Can Do It.** Series with fact packs and posters, 1983. Bureau of Program Services, Division of Occupational Education, Mass. Department of Education.  
Suggests techniques for recruiting Black, Hispanic, limited English-proficient and handicapped students of both sexes as well as females and males into nontraditional programs.

**You Want to be a What? Sex Equity in Massachusetts Vocational Programs.** 1981. Bureau of Program Services, Division of Occupational Education, Mass. Department of Education.  
A study of sex equity implementation in Massachusetts schools from the perspective of nontraditional students.



## The Trades

- Alone in a Crowd: Women in the Trades Tell Their Stories.** 268 pp., 1985.  
Jean Reith Schroedel, Temple University Press, Philadelphia 19122.
- Blue Collar Women: Pioneers on the Male Frontier.** 310 pp., 1981. Mary  
Lindenstien Walshok, Anchor Books, Garden City, NY.
- Futures Unlimited: Expanding Choices in Nontraditional Careers.** 1985  
Arlene S. Chasek. Rutgers University Consortium for Educational Equity, New  
Brunswick, NJ 08903.
- Futures Unlimited II: Expanding Your Horizons in Technical and Vocational  
Education.** Videotape, 29 min., 1985. Consortium for Educational Equity,  
Rutgers University, New Brunswick, NJ 08903.  
Profiles of five women working in high-paying trades and technologies who  
talk about their training, personal lives, and careers.
- Hard Earned Wages: Women Fighting for Better Work.** 241 pp., 1983.  
Jennifer Denney, The Women's Press, 16 Baldwin St., Toronto, Ontario,  
Canada, M5T 1L2.
- Hard Hats, Boots and Goggles: Jobs that Pay. A Look At Nontraditional Jobs  
for Women.** Western Michigan University Center for Women's Services.  
Ellsworth Hall, Kalamazoo, MI 49008-3899.
- Hard Hatted Women: Stories of Struggle and Success in the Trades.** 262 pp.,  
1988. Molly Martin, ed., The Seal Press, Seattle, WA.  
Entertaining short essays in which women describe their experiences in a  
large variety of the trades. Excellent for providing insight into women's  
experiences in the trades, as well as an understanding of a number of  
different occupations.
- High Paying Blue-Collar Jobs for Women.** 1981. Larry J. Ricci, Ballantine  
Books, New York.
- Job Development in Highway Construction: A Roadmap for Women and  
Advocates.** 47 pp., 1986. Southeast Women's Employment Coalition, 328  
Longview Drive, Lexington, KY 40503, (606) 276-1555.
- Time For Change: A Women's Guide to Nontraditional Occupations.** C.D. Cauley  
Ellis Association Incorporated, 5822 East 58th Street South, Tulsa, OK  
74135.
- Trade Secrets: Blue Collar Women Speak Out.** VHS, BETA, 23 min. Stephanie  
Antalocy, Skip Sweeney. Distrib. through Women Make Movies, Inc., 225  
Lafayette St., Suite 212, New York, NY 10012.  
A female welder, electrician, ironworker, and sprinklerfitter, talk about  
changes in their lives when they entered their skilled trades jobs.
- Tradeswomen Resources: A Manual for Tradeswomen and Women Exploring the  
Trades.** 1988. University of Massachusetts Everywoman's Center, Wilder Hall,  
Amherst, MA 01003.

## Women of Color

**Just Between Sisters: Minority Women in Technology.** 29 min. video with supplemental poster set. Consortium for Educational Equity, Rutgers, The State University of New Jersey, Kilmer Campus, Building 4090, New Brunswick, NJ 08903. (201) 932-2071.

Features young, determined black and Hispanic women working in technological jobs, including an aircraft technician, police officer, and sheet metal worker apprentice.

**Minority Women's Survival Kit: Personal And Professional Development for Minority Women.** 1983. Marie Wilson, WEEA Publishing Center, 55 Chapel St., Suite 200, Newton, MA 02160, (617) 969-7100.

**On New Ground.** Videotape, 30 min., 1985. National Asian American Telecommunications Association, CrossCurrent Media, 346 Ninth St., Second Floor, San Francisco, CA 94103. (415) 863-0814.

The experience of 10 Asian-American women working in nontraditional occupations, including a police officer, a welder, and a park ranger.

**Try It: Women and Technical Careers.** Series, VHS, 16 min., 1987. Access for Women, NYC Technical College, 300 Jay St., M-407, Brooklyn, NY 11201. (718) 643-4626.

A New York City woman discusses her personal success as a stationary engineer. The other two videos profile an architect and an engineer. This series focuses on women of color.

**With Silk Wings: Asian-American Women at Work.** Four programs, VHS, 30 min. each, four books included, 1982. National Asian American Telecommunications Association, CrossCurrent Media, 346 Ninth St., Second Floor, San Francisco, CA 94103. (415) 863-0814.

Vignettes of Asian-American women at work in professional and nontraditional occupations. Reviews the history of Asian immigrant women in the US.



## ORGANIZATIONS AND GOVERNMENT RESOURCES

### **ASSOCIATION OF MASSACHUSETTS INSTITUTE OF TECHNOLOGY ALUMNAE**

Contact: Bonny Kellermann  
Building 4-240, MIT  
77 Massachusetts Avenue  
Cambridge, MA 02139  
(617) 253-3354

\* Association of MIT women graduates who give presentations to high school students encouraging them to pursue careers in math and science.

### **ASSOCIATION FOR WOMEN IN MATHEMATICS**

Women's Research Center, Wellesley College  
828 Washington Street  
Wellesley, MA 02181  
(617) 235-0320 ex. 430

\* Membership organization which encourages women to do math and promotes equal opportunity and equal treatment of women in the mathematical community.

### **ASSOCIATION FOR WOMEN IN SCIENCE**

1346 Connecticut Avenue, NW, Suite 1122  
Washington, DC 20036  
(202) 833-1998

\* National organization dedicated to promoting equal opportunities for women to enter the professions and to achieve their career goals.

### **BAY STATE SKILLS CORPORATION - DISPLACED HOMEMAKERS PROGRAM**

101 Summer Street  
Boston, MA 02110  
(617) 292-5100

\* Program which provides job counseling, assistance with job training and job placement services. Displaced Homemaker centers are located throughout the Commonwealth - call the main office for the area nearest you.

### **BUILDING OPPORTUNITIES PROJECT**

Department of Employment and Training  
19 Staniford Street,  
Boston, MA 02114  
(617) 727-6596

\* Coordinates and funds outreach, recruitment, assessment, skills training, apprenticeship preparedness for off-site and on-site jobs associated with "Megaprojects" construction.

### **COALITION OF LABOR UNION WOMEN**

145 Tremont Street, 2nd Floor  
Boston, MA 02111

\* Massachusetts chapter of national coalition. Established to unify union women to determine common problems and concerns and to develop programs within unions to deal with problems.



#### CONSORTIUM FOR EDUCATIONAL EQUITY

Rutgers University

4090 Kilmer Campus

New Brunswick, NJ 08903

(201) 932-2071

\* Assists school districts in eliminating sex bias and discrimination in education. Training and technical assistance available. Trains teachers to conduct family math, family science, and science teams programs. Produces resource materials.

#### DESEGREGATION ASSISTANCE CENTER FOR MASSACHUSETTS:

##### THE NETWORK

The New England Center for Equity Assistance

290 South Main Street

Andover, MA 01810

(508) 470-1080

\* Provides needs assessment services, technical assistance, training, and resources to public schools in the areas of sex, race, and national origin desegregation.

#### EVERYWOMEN'S CENTER

Wilder Hall

University of Massachusetts

Amherst, MA 01003

(413) 585-0883

\* Multi-service center providing information and assistance to women in Western Massachusetts.

#### INDUSTRIAL SERVICES PROGRAM

1 Ashburton Place

Boston, MA 02108

(617) 727-8204 or (617) 576-6788

\* Individuals available for fee who can conduct workshops for women entitled CHOOSING A LIVING WAGE on career options and obstacles. Also conducts a 3-4 hour staff training workshop on occupational segregation.

#### GOVERNOR'S OFFICE ON WOMEN'S ISSUES

The State House, Room 109A

Boston, MA 02133

(617) 727-7853

\* Staff to the Governor on issues affecting women. Develops programs which promote the economic and social well-being of women throughout the Commonwealth.

#### HUBERT HUMPHREY OCCUPATIONAL RESOURCE CENTER

55 New Dudley

Roxbury, MA 02119

(617) 442-5200

\* Vocational high school serving the Boston area.

**MASSACHUSETTS NATIONAL ORGANIZATION FOR WOMEN**

971 Commonwealth Avenue  
Boston, MA 02215  
(617) 782-3241

\* Membership organization involved in every issue relating to full equality of women in society. National, state and local chapters. Sliding fee scale.

**MASSACHUSETTS VOCATIONAL CURRICULUM RESOURCE CENTER**

Minuteman Regional Vocational Technical High School  
758 Marrett Road  
Lexington, MA 02173  
(617) 863-1863  
1-800-362-4371 (Mass. only).

\* Provides curriculum resources to vocational education teachers throughout Massachusetts. Operates free-loan reference library and offers in-service training in curriculum design, development and modification. Includes some materials on sex equity.

**MID-ATLANTIC CENTER FOR SEX EQUITY**

5010 Wisconsin Avenue, N.W., Suite 310  
Washington, D.C. 20016  
(202) 885-8536

\* Provides free services helping public schools meet Title IX requirements and achieve sex equity in educational programs, activities and employment.

**NATIONAL ASSOCIATION OF WOMEN IN CONSTRUCTION**

c/o Engineering Center  
236 Huntington Avenue  
Boston, MA 02115  
(617) 782-3421

\* Boston branch of national organization providing education and information for women in construction.

**NATIONAL WOMEN'S HALL OF FAME**

76 Fall Street  
PO Box 335  
Seneca Falls, NY 13148  
(315) 568-8060

\* Resource for information about American women of achievement.

**NATIONAL WOMEN'S HISTORY PROJECT**

2321 Coddington Center  
Santa Rosa, CA 95402-9901  
(707) 526-5974

\* Promotes multi-cultural women's history, coordinators of The Women's History Network.



#### **NON-TRADITIONAL EMPLOYMENT FOR WOMEN**

105 East 22nd Street  
Room 710  
New York, NY 10010  
(212) 420-0660

\* Employment and training program serving women who want to work in construction, technical trades or other nontraditional fields. Provides women with skills training and placement into trade apprenticeships and a variety of other blue-collar jobs. Useful for information and resources despite New York City orientation.

#### **NORTHEAST CURRICULUM COORDINATION CENTER**

Crest Way  
Aberdeen, NJ 07747  
(201) 290-1900

\* Provides educators with curriculum materials and assists in the development of curriculum and instructional materials pertaining to vocational education. This is the regional center that serves Massachusetts.

#### **PEER (Project on Equal Education Rights)**

1413 K Street N.W. (9th Floor)  
Washington, DC 20005  
(202) 332-7337

\* Resource for those working for equity in education throughout the country.

#### **RESOURCE CENTER ON EDUCATIONAL EQUITY**

Council of Chief State School Officers  
400 North Capitol Street N.W.  
Suite 379  
Washington, DC 20001  
(202) 393-8159

\* Provides services for education policymakers, including technical assistance and personnel, to implement programs to achieve equity in education.

#### **SEX EQUITY COORDINATOR**

Division of Occupational Education  
State Department of Education  
Quincy Center Plaza  
1385 Hancock Street  
Quincy, MA 02169  
(617) 770-7356

\* Responsible for the oversight of the set-asides for sex equity projects in the state; reviews all vocational funding to insure sex equity objectives are incorporated; and ensures that women and men have opportunities in nontraditional career fields.



#### **SOCIETY OF WOMEN ENGINEERS**

United Engineering Center, Room 305  
345 East 47th Street  
New York, NY 10017  
(212) 705-7855

\* Educational service organization. Resource for information about the qualifications and achievements of women engineers and opportunities open to them. Administers several college level scholarship programs.

#### **TRADESWOMEN, INC.**

PO Box 40664  
San Francisco, CA 94140  
(415) 821-7334

\* National membership organization for women in blue-collar occupations providing resources, advocacy, peer support and networking forums.

#### **WIDER OPPORTUNITIES FOR WOMEN, INC.**

1325 G Street N.W., Lower Level  
Washington, D.C. 20005

\* National organization promoting economic independence and equality of opportunity for women and young women; administers national demonstration projects on educational equity at the secondary and post-secondary level.

#### **WOMEN FOR ECONOMIC JUSTICE**

145 Tremont Street  
Boston, MA 02111

\* Advocacy organization promoting progressive economic policies which empower women, particularly low-income women and women of color.

#### **WOMEN IN MACHINING PROGRAM**

Machine Action Project  
Hampden County Employment and Training Consortium  
1176 Main Street  
Springfield, MA 01103  
(413) 781-6900 ex. 72

\* Training program to recruit women into introductory machine technologies. Includes several support components: role models, employment internships, support groups and recruitment materials for nontraditional populations.

#### **WOMEN IN THE BUILDING TRADES**

241 St. Botolph Street  
Boston, MA 02115  
(617) 266-2338

\* Pre-apprenticeship program that provides training, counseling, and placement assistance for women interested in pursuing a career in the building trades.

**WOMEN'S BUREAU**

U.S. Department of Labor  
Room 1600, JFK Building  
Boston, MA 02203

\* Technical assistance, information and referrals for working women. Provides funding to training programs.

**WOMEN'S EDUCATIONAL AND INDUSTRIAL UNION**

365 Boylston Street  
Boston, MA 02116  
(617) 536-5651

\* Individual career counseling, personalized placement service, and career-related workshops and programs for women. Free resource library, open to the public, lists employment opportunities.

**WOMEN'S EDUCATIONAL EQUITY ACT PROGRAM AND PUBLISHING CENTER**

Education Development Center, Inc.  
55 Chapel Street, Suite 239  
Newton, MA 02160  
Attn: Catherine Hanson

\* Programs on awareness of sex bias, educational administration, career preparation, and curricular materials.

**WOMEN'S JOB COUNSELING CENTER**

34 Follen Street  
Cambridge, MA 02138  
(617) 864-9097

\* Career planning and vocational testing. Individual and group sessions available. Library and listings.

**WOMEN'S TECHNICAL INSTITUTE**

1255 Boylston Street  
Boston, MA 02215  
(617) 266-2243

\* Offers certificate programs in Drafting, Electronics, Office Machine Repair, Surveying and Technical Writing. Has a high job placement rate.



## VII. APPENDIX

The following charts summarize the fastest-growing nontraditional occupations in Massachusetts according to their educational requirements.

---

### FASTEST GROWING NONTRADITIONAL OCCUPATIONS IN MASSACHUSETTS THAT REQUIRE A HIGH SCHOOL DIPLOMA OR ON-THE-JOB-TRAINING

---

OCCUPATION	Projected Jobs 1995	New Jobs Created 1984-1995	Percent Increase	Earnings Range
Glaziers	1,820	340	23 %	\$19.40/hr
Guards & Doorkeepers	31,550	9,590	44 %	\$5.34-\$8.47/hr
Heating, Air Conditioning, & Refrigeration Mechanics	6,670	1,190	22 %	\$20.47/hr
Insulation Workers	1,310	310	31 %	\$20.56/hr
Painters, Maintenance	9,480	1,740	23 %	\$19.70/hr
<u>Survey Clerks</u>	<u>1,220</u>	<u>300</u>	<u>33 %</u>	

---

---

**FASTEST GROWING NONTRADITIONAL OCCUPATIONS IN MASSACHUSETTS  
THAT USUALLY REQUIRE SOME POST-SECONDARY EDUCATION**

---

OCCUPATION	Projected Jobs 1995	New Jobs Created 1984-1995	Percent Increase	Earnings Range
Automotive Mechanics	23,360	4,020	21 %	\$7.25-\$10.00/hr
Bricklayers & Stonemasons	3,290	560	21 %	\$19.91/hr
Civil Engineering Technicians	1,980	420	27 %	\$21,000-\$34,840
Computer Programmers	27,650	11,850	75 %	\$20,800-\$29,450
Computer Service Technicians	6,750	3,390	101 %	\$8.50-\$12.33/hr
Electrical & Electronic Technicians	32,940	11,800	56 %	\$19,300-\$25,900
Industrial Engineering Technicians	1,190	230	24 %	---
Mechanical Engineering Technicians	5,670	1,360	32 %	\$18,000-\$24,000
Office Machine Servicers	1,640	500	44 %	\$390-\$720/week
Plumbers & Pipefitters	11,970	2,450	26 %	\$26.90/hr

---



**FASTEST GROWING NONTRADITIONAL OCCUPATIONS IN MASSACHUSETTS  
THAT USUALLY REQUIRE AT LEAST A BACHELOR'S DEGREE**

OCCUPATION	Projected Jobs 1995	New Jobs Created 1984-1995	Percent Increase	Earnings Range
Aeronautical & Astronautical Engineers	500	120	32 %	---
Architects	3,980	910	30 %	\$25,000-\$57,500
Civil Engineers	8,210	1,490	22 %	\$24,000-\$60,000
Computer Systems Analysts	26,150	11,700	81 %	\$23,500-\$45,000
Cost Estimators	3,850	690	22 %	\$18,500-\$43,160
Electrical & Electronic Engineers	39,720	14,790	59 %	\$26,700-\$49,324
Industrial Engineers	8,490	2,150	34 %	\$24,500-\$40,000
Lawyers	18,790	5,040	37 %	\$28,000-\$60,000
Mechanical Engineers	12,240	2,830	31 %	\$24,000-\$55,000
Medical Scientists	650	140	28 %	---
Optometrists	1,050	250	31 %	---
Physicians & Surgeons	20,580	3,430	20 %	\$50,000-\$90,000
Physicists	2,190	380	21 %	\$18,360-\$42,600

**SOURCES:** Massachusetts Job Outlook, Occupational Employment Projected Changes 1984-1995, Division of Employment Security, 1987.

Ninety Jobs for the Nineties, Division of Employment Security, 1988.

## VIII. APPENDIX B: WOMEN IN NON-TRADITIONAL CAREERS

What follows is several interviews with women who speak about their experiences working in nontraditional fields.

### Maria Tritto, Police Officer

Maria, what do you do?

I'm a police officer in the Boston Police Department. I'm a patrol officer, which means that I'm assigned to a radio car and respond to 911 emergency calls. I do a lot of referral work with domestic violence cases and family abuse law, and I go to community service meetings in the different neighborhoods of downtown Boston.

What is referral work?

Sometimes the police are the first responders to a domestic incident, like a family fight or a case of child abuse. Once we've resolved the initial emergency, we try to put the people who are involved in the crisis into social service networks or send them to people who can help them in the long-term.

Have you held any other jobs?

Yes. When I graduated from high school I started off as a file clerk at Dun & Bradstreet and then I went to Mass. General Hospital where I was a medical secretary for about a year and half. I left Mass. General to take a job at the Police Department.

How does policing compare to the other jobs you have held?

Completely different. At the other jobs it was clerical work and secretarial work and I was chained to a desk or an office or stuck with the telephone. Being a police officer, I'm my own boss out on the street. I have the decision to make. It means much more freedom and it gives you much more credit for your intelligence than being a secretary does.

The earnings, too, are unbelievably different. As a high school graduate, a secretary nowadays can expect to make somewhere between \$200 and \$300 a week. I make more than double that weekly.

What made you decide to go into the police force?

When I was working at Mass. General I wasn't financially able to go back to school, and that was the only way to get a better-paying job. The police department at that time was recruiting police cadets and it was advertised as on-the-job training. It just fit into my needs at the time: it was like going to school and getting paid while doing so.

It's been ten years and I'm very glad I did it. I am back in school now--not to change careers or anything, just for personal satisfaction. Being a police officer is a very busy and rewarding career.



Are there any advantages or disadvantages in being a woman on the police force?

Well, we are in a very small minority in the police department. In the beginning it's very difficult to be the only female in a unit or a district. Most of the men are caught up in this image of policing being a tough job and so they don't think that females can handle it. But if you prove yourself--not in a tough way, in a common sense way--then you have nothing to worry about. Once you've demonstrated that to the people that are on the street that need your help, and the people that you work with, then you've got it licked.

In a lot of cases, however, it is an advantage. I worked in the drug unit. It was very easy for me to go undercover because most drug dealers don't expect a female officer to be knocking at their door. Sometimes even on the street, you can diffuse a situation just by being present. A big male who is having an argument with a female police officer, he doesn't want to strike her and he doesn't have to prove himself to her like he would with a male police officer.

What would you say to other women who are interested in policing?

Do it. It's wide open for women right now. I think that policing is going to cater to women even more, in that, as I said about the drug unit, you need female officers. The sexual assault unit, for instance: most women who have been raped feel more comfortable speaking to a woman officer about it. It's a difficult situation, but having a female there really does wonders in the investigation and follow-up. And the pay is fantastic. There are a lot of financial rewards.

Judith Nitsch, Civil Engineer

What is your job?

I'm a civil engineer and I'm the principal in a consulting firm in Cambridge. We do civil site engineering, which is our biggest group and it's the one that I'm in charge of and we also do structural engineering, architecture, land surveying, and traffic engineering. We have about twelve or thirteen in the site engineering department. Four of the graduate civil engineers that we have are women.

What do you do in your job?

As a site engineer, what I get involved in is land development projects. What that involves is working with an architect for either renovation or new construction of anything from a single-family subdivision, a condominium development, an office building, a shopping center, a theater complex--Showcase Cinema and General Cinemas are two of our larger clients. We can see a lot of our work as we drive down highways.

What we get involved in is the road design: designing the grades, designing where the curves are, where the straight sections are, designing the drainage for the road, etc. For a condominium development or say for an office park, we get involved in the parking design, laying out the parking spaces and the grading for that, looking at traffic flow patterns within a parking lot, and designing the drainage for the site and the septic system or sewer. Then we get involved in the permitting for getting approvals from the town or the state or the federal government for a project. A lot of that involves making presentations before a town planning board or a conservation commission, for instance.

What projects have you worked on?

My first large project when I got out of college was a road redesign in the town of Wellesley. Our client was the town and I was the project engineer on it. Wellesley Street is a major traffic carrier between the north and south sides of town. I designed that my first summer out of college and it was built the following summer. To this day when I drive down the road, and it's like, here's something tangible and this is here because I did it.

Another client that I work for is General Cinemas. They're the biggest movie theater chain in the U.S. and I've designed projects of theirs in probably twelve or fourteen states. We do the site design for their theaters.

Can you tell me why you decided to go into engineering?

I had very good grades in high school and was told by many people that I should be a nurse or teacher and I rebelled. I really didn't know what I wanted to do, I didn't know what an engineer was, I just knew I liked math and science. When I visited Worcester Polytechnic Institute in September of my senior year of high school, I liked the place, applied, and was accepted. I started out as a math major and switched to civil engineering during my freshman year.

So you're happy with your decision to go into engineering?

Very definitely. There aren't too many people that can say they go to work and they really like what they do, enjoy it and get satisfaction out of it, and I do.

Has being a woman given you any special advantages or disadvantages?

I would say that there are more advantages than disadvantages. I graduated from college in 1975 when the number of women in engineering was very much less than it is now. My biggest advantage was that I was remembered. When I went back for the next job, I'd hear "Oh yeah, she did this job, it was a good job" etc., and it helped me.

Many times I'd go in to meet a town engineer to get some information when I was starting a project and--this happened to me in the town of Franklin--I went back to get some regulations 6 years later and the fellow that was giving



them to me looked at me and said "Aren't you Judy from Scofield Brothers?" and I said "Yes, how did you remember me?" and he said "I've never met another woman engineer." I said, "This has been five years!" So automatically we were starting out on the right foot with the second project.

There are a few disadvantages. There are some clients and some town officials that just don't want to listen to a woman. We had one town that we did a lot of work in, and whenever I submitted a drawing it would get rejected. It was really bugging me because my boss and I knew that the design was right. So we just decided that it wasn't worth it for me to do projects in this town. I realize it's not my problem, it's his problem.

What would you say to other women who are interested in engineering?

I would say that probably the most important thing is to talk to people about it. I'm sure no one has ever mentioned engineering as a possible career choice to them. People don't think of it and they're not really familiar with what the difference is between civil engineering and mechanical engineering, for instance. You really have to talk to someone who is a civil engineer or a mechanical engineer.

It's a fun job. You get satisfaction because you have a tangible work product. There was a study in Parade Magazine several years ago about starting salaries of women versus men college graduates. The only field in which women were getting the same or better starting salaries than men was engineering. We have three new graduates here right now at \$29,000 a year. Money shouldn't be the primary consideration, but if you like math and science, and you don't really know what to do, it's a good career to consider.

## ACKNOWLEDGEMENTS

The Governor's Office on Women's Issues would like to thank the individuals who have assisted in the production of this guide:

Vivien Li, Governor's Advisor on Women's Issues  
Kirsten Hertz, Assistant Director  
Julia Modigliani, Project Director  
Danielle R. Gabriel, Administrative Assistant  
Leigh A. Fairchild, Intern  
Julie E. Green, Intern  
Serena Satyasai, Intern  
Elizabeth S. Westfall, Intern

In addition, we extend our appreciation to the following individuals:

Jill Feblowitz	Building Opportunities Project
Jenifer Firestone	Industrial Services Program
Priscilla Golding	Women in the Building Trades
Happy Green	Executive Office of Labor
Anne Marie McDonald	Massachusetts Department of Education
Judith Nitsch	Allen, Demurjian, Major & Nitsch
Hannah Finan Roditi	Non-traditional career specialist
Maria Tritto	Boston Police Department

We would also like to thank the staff at Central Reprographics for their assistance

This handbook was researched and written by Julie E. Green.





